We Claim:

1. A heat transfer probe comprising:

an inner tube having an opening;

an outer tube surrounding the inner tube and configured to receive working fluid from the inner tube through the opening;

a tip adjacent the opening and which terminates the inner and outer tubes; and

a first temperature sensor coupled to the tip.

2. The probe of claim 1, the first temperature sensor being connected to the tip.

3. The probe of claim 1, the inner and outer tubes defining concentric channels.

4. The probe of claim 1, further comprising a second temperature sensor spaced apart from the first temperature sensor.

5. The probe of claim 5, further comprising an isolation member coupling the second temperature sensor to the outer tube.

6. The probe of claim 4, further comprising a third temperature sensor coupled to an outlet of the outer tube.

7. The probe of claim 1:

the inner tube comprising a first material;

the outer tube comprising a second material; and

the tip comprising a third material having a thermal conductivity different from that of the first or second material.

8. The probe of claim 7, the first and second materials being the same.

9. The probe of claim 1, further comprising a probe holder coupled to the outer tube.

10. The probe of claim 1, the temperature sensor comprising a thermocouple.

11. A heat transfer probe, comprising:

an inner channel configured to transport working fluid from an inner inlet to an inner outlet;

a tip configured to receive at least a portion of the working fluid from the inner outlet;

a concentric outer channel configured to transport the working fluid from the inner outlet to an outer outlet;

a first temperature sensor coupled to the tip; and

a second temperature sensor spaced apart from the first temperature sensor.

12. A heat transfer probe, comprising:

an inner tube having an opening and comprising a first material;

an outer tube surrounding the inner tube, comprising a second material, and configured for fluid communication with the inner tube through the opening, the inner and outer tubes defining concentric channels;

a tip adjacent the opening, comprising a third material having a thermal conductivity different from that of the first or second material, and terminating the inner and outer tubes;

a first temperature sensor coupled to the tip;

a second temperature sensor spaced apart from the tip and the first temperature sensor; and

an isolation member coupling the second temperature sensor to the outer tube.

13. The probe of claim 12, further comprising a third temperature sensor coupled to an outlet of the outer tube.

14. The probe of claim 12, the first and second materials being the same.

15. A system for effecting heat transfer in tissue, comprising:

a heat transfer probe comprising:

an inner tube having an opening;

an outer tube surrounding the inner tube and configured to receive working fluid from the inner tube through the opening;

a tip adjacent the opening that terminates the inner and outer tubes; and

a temperature sensor coupled to the tip;

a source for delivering working fluid to the inner tube and to receive working fluid from the outer tube;

a pump coupled to the source; and

a controller to control the flow of working fluid to effect heating or cooling of tissue adjacent the probe.

16. The system of claim 15, the controller receiving feedback from the temperature sensor to adaptively control the flow of working fluid based on a sensed temperature.

17. A system for cooling and monitoring tissue, comprising:

a probe adapted to be inserted into tissue, the probe comprising first and second concentric channels, the first and second concentric channels each having an inlet and an outlet;

a source of working fluid in fluid communication with the first and second concentric channels;

a pump operatively associated with the source and probe;

a first temperature sensor mounted to the probe and adapted to monitor the temperature of the tissue engaging the probe; and

a second temperature sensor mounted radially from the probe and adapted to monitor the temperature of the tissue engaging second temperature sensor.

18. The system of claim 17, further comprising a drainage conduit.

19. The system of claim 17, further comprising a controller to control the flow of working fluid to effect a temperature change of the material.

20. The system of claim 19, the controller receiving feedback from the first or second temperature sensor to adaptively control the flow of working fluid based on a sensed temperature.

21. A method comprising:

transporting working fluid from a source through an inner channel of a probe to change a temperature of tissue adjacent the probe;

transporting the working fluid through a concentric outer channel of the probe back to the source;

sensing a first temperature of the tissue at a first location using a first temperature sensor coupled to the probe;

sensing a second temperature of the tissue at a second location using a second temperature sensor spaced apart from the first temperature sensor.

22. The method of claim 21, further comprising:

comparing the first and second temperatures; and

calculating a thermal transport property of the tissue based on the comparison.

23. The method of claim 22, further comprising determining a health of the tissue based on the thermal transport property.

24. The method of claim 23, determining the health comprising determining whether the tissue is alive or dead.

25. The method of claim 21, further comprising:

comparing the first and second temperatures; and

adjusting a flow rate of the working fluid based on the comparison.

26. A method of heat transfer and monitoring of tissue, comprising:

inserting a probe into the tissue, the probe having concentric passageways and a temperature sensor;

inserting a second temperature sensor into the tissue at a predetermined distance from the probe;

directing working fluid through the probe; and

comparing the temperature sensed by the first temperature sensor to the temperature sensed by the second temperature sensor.

27. The method of claim 26, further comprising determining the health of the tissue based on the comparison.

28. The method of claim 26, determining the health comprising determining whether the tissue is alive or dead.

29. Computer readable media comprising instructions for:

obtaining a first temperature of tissue sensed by a first temperature sensor coupled to a heat transfer probe;

obtaining a second temperature of the tissue sensed by a second temperature sensor spaced apart from the first temperature sensor;

comparing the first and second temperatures; and

calculating a thermal transport property of the tissue.

30. The media of claim 29, further comprising instructions for indicating a health of the tissue based on the thermal transport property.

31. The media of claim 30, the instructions for indicating the health comprising instructions for indicating whether the tissue is alive or dead.

32. The media of claim 29, further comprising instructions for providing a signal to a controller used for varying a flow rate of working fluid.